

In re: Hanley-Bowdoin et al.
Attorney Docket No. 5051.458
Application Serial No.: 09/289,346
Filed: April 9, 1999

In the specification, on page 39, lines 18-28, please delete the paragraph therein and substitute therefor:

C2
--The ability of the mutants to repress AL1 promoter activity in vivo was studied. The AL1 promoter fused to the luciferase reporter gene (*lux*) was transfected into *N. benthamiana* protoplasts either alone or in the presence of plant expression cassettes for wild type and mutant AL1 proteins. In these experiments, wild type AL1 repressed transcription from the AL1 promoter approximately 20-fold. Repression mediated by mutant AL1 proteins was standardized to the percent of wild type repression within each experiment. All of the mutants that reduced viral DNA replication (except for Ala1), also repressed promoter activity 2- to 4-fold higher than wild type AL1. DNA binding is required for repression and Ala1 is a DNA binding mutant. AL1 K—E179 (Ala10) supported normal replication levels and repressed the AL1 promoter similar to wild type AL1. Figure 6A (see lane 13) and Figure 6B.—

IN THE CLAIMS

Please cancel claims ~~42-48~~ and ~~50-54~~ without prejudice.

Please add the following new claims.

C3
60. (New) An isolated nucleic acid comprising a nucleotide sequence encoding a mutant AL1 protein, said nucleotide sequence comprising a mutation in the Rb binding region, whereby binding of said mutant AL1 protein to a plant Rb protein is reduced compared to wild-type binding, and wherein said nucleic acid comprises a nucleotide sequence selected from the group consisting of SEQ ID NO:2 (Ala1), SEQ ID NO:15 (Ala5), SEQ ID NO:4 (Ala6), SEQ ID NO:5 (Ala7), SEQ ID NO:7 (Ala9), SEQ ID NO:8 (Ala13) and SEQ ID NO:10 (Leu).

61. (New) The nucleic acid of claim 60, further comprising a nucleotide sequence comprising a mutation in the oligomerization domain, wherein the nucleotide

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sequence is selected from the group consisting of SEQ ID NO:2 (Ala1), SEQ ID NO:12 (Ala2), SEQ ID NO:13 (Ala3), SEQ ID NO:14 (Ala4), SEQ ID NO:3 (Ala4+5), SEQ ID NO:15 (Ala5), SEQ ID NO:4 (Ala6), SEQ ID NO:5 (Ala7), SEQ ID NO:7 (Ala9), SEQ ID NO:9 (Ala14) and SEQ ID NO:10 (Leu).

62. (New) The nucleic acid of claim 60, further comprising a nucleotide sequence comprising a mutation in the AL1 protein, whereby repression of transcription from the AL1 promoter is increased compared to wild-type AL1 protein, and wherein the nucleotide sequence is selected from the group consisting of SEQ ID NO:15 (Ala5), SEQ ID NO:4 (Ala6), SEQ ID NO:5 (Ala7), SEQ ID NO:7 (Ala9), SEQ ID NO:8 (Ala13), SEQ ID NO:12 (Ala2), SEQ ID NO:13 (Ala3), SEQ ID NO:14 (Ala4), SEQ ID NO:3 (Ala 4+5), SEQ ID NO:6 (Ala8) and SEQ ID NO:9 (Ala14).

63. (New) A vector comprising the nucleic acid of claim 60.

64. (New) A vector comprising the nucleic acid of claim 61.

65. (New) A vector comprising the nucleic acid of claim 62.

66. (New) An isolated nucleic acid comprising a nucleotide sequence encoding a mutant AL1 protein, wherein said nucleotide sequence comprises a mutation in the oligomerization domain, wherein said nucleic acid comprises a nucleotide sequence selected from the group consisting of SEQ ID NO:2 (Ala1), SEQ ID NO:12 (Ala2), SEQ ID NO:13 (Ala3), SEQ ID NO:14 (Ala4), SEQ ID NO:3 (Ala4+5), SEQ ID NO:15 (Ala5), SEQ ID NO:4 (Ala6), SEQ ID NO:5 (Ala7), SEQ ID NO:7 (Ala9), SEQ ID NO:9 (Ala14) and SEQ ID NO:10 (Leu).

67. (New) The nucleic acid of claim 66, further comprising a nucleotide sequence comprising a mutation in the Rb binding region, whereby binding of said

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mutant AL1 protein to a plant Rb protein is reduced compared to wild-type binding, and wherein the nucleotide sequence is selected from the group consisting of SEQ ID NO:2 (Ala1), SEQ ID NO:15 (Ala5), SEQ ID NO:4 (Ala6), SEQ ID NO:5 (Ala7), SEQ ID NO:7 (Ala9), SEQ ID NO:8 (Ala13) and SEQ ID NO:10 (Leu).

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6A
68. (New) The nucleic acid of claim 66, further comprising a nucleotide sequence comprising a mutation in the AL1 protein, whereby repression of transcription from the AL1 promoter is increased compared to wild-type AL1 protein, and wherein the nucleotide sequence is selected from the group consisting of SEQ ID NO:15 (Ala5), SEQ ID NO:4 (Ala6), SEQ ID NO:5 (Ala7), SEQ ID NO:7 (Ala9), SEQ ID NO:8 (Ala13), SEQ ID NO:12 (Ala2), SEQ ID NO:13 (Ala3), SEQ ID NO:14 (Ala4), SEQ ID NO:3 (Ala 4+5), SEQ ID NO:6 (Ala8) and SEQ ID NO:9 (Ala14).

69. (New) A vector comprising the nucleic acid of claim 66.

70. (New) A vector comprising the nucleic acid of claim 67.

71. (New) A vector comprising the nucleic acid of claim 68.

72. (New) An isolated nucleic acid comprising a nucleotide sequence comprising a mutation in the AL1 protein, whereby repression of transcription from the AL1 promoter is increased compared to wild-type AL1 protein, and wherein said nucleic acid comprises a nucleotide sequence selected from the group consisting of SEQ ID NO:15 (Ala5), SEQ ID NO:4 (Ala6), SEQ ID NO:5 (Ala7), SEQ ID NO:7 (Ala9), SEQ ID NO:8 (Ala13), SEQ ID NO:12 (Ala2), SEQ ID NO:13 (Ala3), SEQ ID NO:14 (Ala4), SEQ ID NO:3 (Ala 4+5), SEQ ID NO:6 (Ala8) and SEQ ID NO:9 (Ala14).

73. (New) The nucleic acid of claim 72, further comprising a nucleotide sequence comprising a mutation in the Rb binding region, whereby binding of said

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mutant AL1 protein to a plant Rb protein is reduced compared to wild-type binding, and wherein the nucleotide sequence is selected from the group consisting of SEQ ID NO:2 (Ala1), SEQ ID NO:15 (Ala5), SEQ ID NO:4 (Ala6), SEQ ID NO:5 (Ala7), SEQ ID NO:7 (Ala9), SEQ ID NO:8 (Ala 13) and SEQ ID NO:10 (Leu).

74. (New) The nucleic acid of claim 72, further comprising a nucleotide sequence comprising a mutation in the oligomerization domain, wherein the nucleotide sequence is selected from the group consisting of SEQ ID NO:2 (Ala1), SEQ ID NO:12 (Ala2), SEQ ID NO:13 (Ala3), SEQ ID NO:14 (Ala4), SEQ ID NO:3 (Ala4+5), SEQ ID NO:15 (Ala5), SEQ ID NO:4 (Ala6), SEQ ID NO:5 (Ala7), SEQ ID NO:7 (Ala9), SEQ ID NO:9 (Ala14) and SEQ ID NO:10 (Leu).

75. (New) A vector comprising the nucleic acid of claim 72.

76. (New) A vector comprising the nucleic acid of claim 73.

77. (New) A vector comprising the nucleic acid of claim 74.

78. (New) A method of making a transgenic plant having increased resistance to geminivirus infection, comprising:

a) introducing the nucleic acid of claim 60 into a plant cell capable of regeneration; and

b) regenerating a transgenic plant from said plant cell, wherein expression of said nucleic acid encoding a mutant AL1 protein increases resistance of said plant to infection by at least one geminivirus, compared to a control plant.

79. (New) A method of making a transgenic plant having increased resistance to geminivirus infection, comprising:

a) introducing the nucleic acid of claim 61 into a plant cell capable of regeneration; and

b) regenerating a transgenic plant from said plant cell, wherein expression of said nucleic acid encoding a mutant AL1 protein increases resistance of said plant to infection by at least one geminivirus, compared to a control plant.

80. (New) A method of making a transgenic plant having increased resistance to geminivirus infection, comprising:

a) introducing the nucleic acid of claim 62 into a plant cell capable of regeneration; and

b) regenerating a transgenic plant from said plant cell, wherein expression of said nucleic acid encoding a mutant AL1 protein increases resistance of said plant to infection by at least one geminivirus, compared to a control plant.

81. (New) A method of making a transgenic plant having increased resistance to geminivirus infection, comprising:

a) introducing the nucleic acid of claim 66 into a plant cell capable of regeneration; and

b) regenerating a transgenic plant from said plant cell, wherein expression of said nucleic acid encoding a mutant AL1 protein increases resistance of said plant to infection by at least one geminivirus, compared to a control plant.

82. (New) A method of making a transgenic plant having increased resistance to geminivirus infection, comprising:

a) introducing the nucleic acid of claim 67 into a plant cell capable of regeneration; and

b) regenerating a transgenic plant from said plant cell, wherein expression of said nucleic acid encoding a mutant AL1 protein increases resistance of said plant to infection by at least one geminivirus, compared to a control plant.

83. (New) A method of making a transgenic plant having increased resistance to geminivirus infection, comprising:

a) introducing the nucleic acid of claim 68 into a plant cell capable of regeneration; and

b) regenerating a transgenic plant from said plant cell, wherein expression of said nucleic acid encoding a mutant AL1 protein increases resistance of said plant to infection by at least one geminivirus, compared to a control plant.

84. (New) A method of making a transgenic plant having increased resistance to geminivirus infection, comprising:

a) introducing the nucleic acid of claim 72 into a plant cell capable of regeneration; and

b) regenerating a transgenic plant from said plant cell, wherein expression of said nucleic acid encoding a mutant AL1 protein increases resistance of said plant to infection by at least one geminivirus, compared to a control plant.

85. (New) A method of making a transgenic plant having increased resistance to geminivirus infection, comprising:

a) introducing the nucleic acid of claim 73 into a plant cell capable of regeneration; and

b) regenerating a transgenic plant from said plant cell, wherein expression of said nucleic acid encoding a mutant AL1 protein increases resistance of said plant to infection by at least one geminivirus, compared to a control plant.

86. (New) A method of making a transgenic plant having increased resistance to geminivirus infection, comprising:

a) introducing the nucleic acid of claim 74 into a plant cell capable of regeneration; and